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Outbreak of Paralytic Shellfish Poisoning - Pingtung and Kaohsiung Counties

During January 1-2, 1986, an outbreak of paralytic shellfish poisoning occurred in southern Taiwan. At least 9 separate episodes of poisoning occurred over a two-day period: two banquets and one restaurant-associated outbreak in Pingtung County, and six outbreaks among family members in both Kaohsiung and Pingtung Counties, and Kaohsiung City. A total of 116 persons were ill. Attack rates for the two banquets were 32% and 34%. Twenty-four persons were hospitalized; two died. All affected individuals had eaten a specific type of clam, *Sanguinolaria rostrata*, known locally as "beauty's tongue". In some cases, clams were the only food items eaten. The incubation period ranged from 30 minutes to 7 hours with a median of 1.5 hours. Illness lasted from 1 to 9 days with a median of 1 day. Signs and symptoms included perioral numbness (74%), numbness of the tongue (69%) and extremities (62%), nausea (37%), dizziness (35%), vomiting (34%), respiratory difficulty (22%), headache (21%), flushing (11%), and hypertension (systolic blood pressure >160mmHg) (5%).

Clams associated with illness all came from one commercial pond located in Pingtung County. Preliminary laboratory results showed that extracts of clams recovered from this pond and from leftovers contained a water-soluble, heat- and acid-stable neurotoxin similar to saxitoxin by mouse bioassay and thin layer chromatography. Specimens from this outbreak have been sent to several reference laboratories for confirmation. Plankton from the implicated pond was examined microscopically, and although several species of di-

noflagellates were identified, none from the saxitoxin-producing genus *Gonynaulax* were found. Mass media communication was used to inform the general public to avoid eating shellfish until other ponds in the Pingtung area could be checked. Clams tested from 30 other commercial ponds in southern Taiwan, including one in the immediate vicinity of the implicated pond, showed no evidence of toxicity. The water source for the implicated pond was a brackish tidal estuary. At the time of investigation, 3-4 days after the implicated clams were harvested, the pond water was not discolored. The species and source of toxin-producing algae responsible for this outbreak and the environmental conditions which led to its growth are still under investigation.

Reported by Kaohsiung City Health Department, Pingtung and Kaohsiung County Health Bureaus, Provincial Bureau of Fisheries, Bureaus of Disease Control, Food Sanitation, and Food and Drug Laboratory, Department of Health, the Executive Yuan

Editorial note: Paralytic shellfish poisoning (PSP) occurs worldwide and results from ingestion of a variety of shellfish containing potent neurotoxins produced by several species of dinoflagellates[1]. Under certain environmental conditions optimal for growth, dinoflagellates "bloom" in excessive numbers and often color the water amber or red resulting in so-called "red tide". Toxic organisms, however, may not always be present in sufficient numbers to discolor the water, and yet may be numerous enough to make shellfish toxic. Conversely, "red tide" may be caused by non-toxic species of dinoflagellates.

Outbreaks of PSP are usually associated with shellfish harvested from coastal waters; we are unaware of other outbreaks caused by shellfish grown in commercial ponds. *Sanguinolaria rostrata* clams have been cultivated in ponds in Taiwan since 1984[2]. At present, there are 83 such ponds. None are routinely checked for toxins. There is only one previous report of a possible outbreak of PSP in Taiwan in Chiayi County in 1955[3]. In this report, 6 person had neurologic signs and symptoms after eating shellfish harvested from coastal waters near Chiayi. One person died.

Hypertension is an unusual manifestation of saxitoxin poisoning. Saxitoxin usually causes hypotension through direct action on the vascular muscle, and through blockade of the vasoconstrictor nerves at higher doses[4]. Low doses of saxitoxin have produced a secondary pressor effect in cats[4], and hypertension was reported in three human cases in an outbreak of PSP in England in 1968[5].

The overall mortality from PSP is low ($\leq 10\%$)[1], and recovery is usually complete. The cause of death for the two fatal cases in this outbreak remains unclear. Both died in hospital within 4 hours of admission.

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